

ADDITIONAL



Service Manual

ORDER NO.
ARP-818-0

FM/AM DIGITAL SYNTHESIZER TUNER

TX-220Z

ZEZ

TX-221Z

ZEZ

- For servicing these type, please refer to the F-X20ZL service manual (ARP-719) with the exception of this additional service manual.
- This additional service manual is applicable to ZEZ type.

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1. SPECIFICATIONS

FM Tuner Section

Frequency range	87.5 MHz to 108 MHz
Usable Sensitivity	11.2 dBf, IHF (1.0 V/75 ohms)
Sensitivity (DIN)	Mono: 0.9 μ V / 75 ohms Stereo: 31.5 μ V / 75 ohms
Signal-to-Noise Ratio (IHF, 85 dBf Input)	Mono: 77 dB Stereo: 73 dB
Signal-to-Noise Ratio (DIN)	Mono: 66 dB Stereo: 60 dB
Distortion	Stereo: 0.4% (1 kHz)
Alternate Channel Selectivity	67 dB (400 kHz)
Stereo Separation	40 dB (1 kHz)
Antenna Input	300 ohm balanced 75 ohm unbalanced

MW Tuner Section

Frequency range	531 kHz to 1602 kHz
Sensitivity (IHF, Loop antenna)	300 μ V/m
Signbal-to-Noise Ratio	50 dB
Antenna	Loop Antenna

Miscellaneous

Dimensions	420(W) x 58(H) x 215(D) mm
Weight (without package)	1.9 kg
Furnished Parts	
FM T-type Antenna	1
AM Loop Antenna	1
Coaxial connector	1
Connection Cable	1

2. CONTRAST OF MISCELLANEOUS PARTS

TX-220Z/ZEZ and TX-221Z/ZEZ types are the same as the F-X20ZL/ZEB type with the exception of the following sections.

Mark	Symbol & Description	Part No.			Remarks
		F-X20ZL/ZEB	TX-221Z/ZEZ	TX-220Z/ZEZ	
	Tuner assembly	GWE-231	GWE-232	GWE-232	
	FE assembly	...	AWB-063	AWB-063	
	Connector socket	...	AKX-206	AKX-206	
	Bonnet case	ANE-529	ANE-597	ANE-597	
	Front panel	ANM-846	ANY-027	ANY-067	
	Display cover	ANR-968	ANZ-111	ANZ-129	
	Display cap	ANR-969	ANZ-130	ANZ-131	
	Coaxial connector	...	AKX-090	AKX-090	
	Packing case	AHE-463	AHE-595	AHE-596	
	Nut (M12)	...	NKX2FNI	NKX2FNI	(for connector socket)
	Washer	...	WAX3F176N050	WAX3F176N050	(for connector socket)

3. ELECTRICAL PARTS LIST

NOTES:

- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	56×10^1	561 RD%PS 561 J
47kΩ	47×10^3	473 RD%PS 473 J
0.5Ω	0R5	RN2H 0R5 K
1Ω	010	RSIP 010 K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	562×10^1	5621 RN%SR 5621 F
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- The **A** mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

- For your Parts Stock Control, the fast moving items are indicated with the marks **★★** and **★**.

★★ GENERALLY MOVES FASTER THAN ★

This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Miscellaneous Parts

P. C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	Tuner assembly	GWE-232
	FE assembly	AWB-063
	Switch assembly	Non supply
	LED assembly	Non supply

Tuner Assembly (GWE-232)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC301	AN7470
★★	IC401	LA1260
★★	IC702	TC9157AP
★★	IC701	TD6104P
★★	IC703	TD6301AP
★	D405, D605	RD5.6EB (HZ5.6EB)
★	D401, D402,	SVC321C2/D2
★	D301, D404, D406—D410, D702—D704, D707—D709	1S1555 (US1035) (1SS131)
★★	Q304, Q407, Q408, Q605, Q607	2SA933S
★★	Q301—Q303, Q401—Q404, Q608, Q606, Q701—Q707	2SC1740S
★★	Q201	2SC2668
★★	Q406	2SK161-Y (2SK241-Y)

SWITCHES

Mark	Symbol & Description	Part No.
★★	S3—S11, S15, S16 Tact switch [STATION CALL MEMORY FUNCTION]	ASG-711 (ASG-703)

COILS, FILTERS AND TRANSFORMERS

Mark	Symbol & Description	Part No.
T401	AM antenna transformer	ATB-099
L401	AM OSC coil	ATB-100
L202	FM DET coil	ATE-072
F202	FM ceramic filter	ATF-107
F201	FM ceramic filter	ATF-119
F401	AM ceramic filter	ATF-133
F301	Beat eliminate filter	ATF-146
L203	Inductor	ATH-116
L201	Inductor	ATH-049

CAPACITORS

Mark	Symbol & Description	Part No.
C713	(3300μF/10V)	ACH-389
TC401, TC402	Trimmer	ACM-015
C716		CCCCH180J50 (CCCDCH180J50)
C416, C718		CCCSL221J50 (CCDSL221J50)
C401		CCDCH080D50
C404, C717		CCDCH150J50
C426		CCDSL101J50
C422		CEANP4R7M35
C308, C427		CEAR22M50L
C425, C702, C709, C711, C712		CEAO10M50L

TX-220Z/ZEZ, TX-221Z/ZEZ

Mark	Symbol and Description	Part No.
C306, C705	CEA1R5M50L	
C418, C723	CEA100M16L	
C312, C313, C423	CEA2R2M50L	
C303, C604	CEA221M16L	
C301, C302, C307, C701	CEA3R3M50L	
C703	CEA330M16L	
C311, C414	CEA470M25L	
C720	CEA471M16L	
C714	CEA471M6L	
C309, C310, C410, C411	CKCYB102K50 (CKDYB102K50)	
C314, C315	CKCYB472K50 (CKDYB472K50)	
C316	CKCYB681K50 (CKDYB681K50)	
C305, C412, C413, C419, C710	CKCYF473Z50 (CKDYF473Z50)	
C415	CKCYX473M25 (CKDYX473M25)	
C201, C403, C420, C704, C706—C708, C721, C722, C724	CKDYF103Z50	
C214, C402, C407, C408, C715, C719, C320, C321	CKDYF223Z50	
C421	CQMA104J50	
C405	CQSA431J50	
C304	CQSA471J50	

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR401 Semi-fixed (220k)	VRTB6VS224
★	VR301 Semi-fixed (4.7k)	VRTB6VS472
▲	R601	RS1LMF151J
	R720, R721 Resistor array	RA12S473J
	R421, R431, R432, R404	RD1/4PM□□□J
	Other resistors	RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Termianl (ANTENNA)	AKA-024
	Terminal (AC and DC power supply/output)	AKP-083
★	V1 FL tube	AAV-028
	X701 Crystal resonator	ASS-025
	FE assembly	AWB-063

Switch Assembly

SWITCHES

Mark	Symbol & Description	Part No.
★★	S12, S13 Tact switch (TUNING)	ASG-711 (ASG-703)

LED Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★	D902 LED	AEL-424
★	D901 LED	AEL-382

FE Assembly (AWB-063)(on the GWE-232)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★	D101—104	1SV147
★★	Q102	2SC2668
★★	Q105	2SC2786-L
★★	Q101, Q103, Q104	2SK241-Y
★	D110	ISS131

COILS AND TRANSFORMERS

Mark	Symbol & Description	Part No.
L101	FM antenna coil	ATC-192
T101	FM RF transformer	ATC-194
L104	FM OSC coil	ATC-214
L103	FM RF coil	ATC-247
L102	FM tuning coil	ATC-248
T102	FM coupling transformer	ATE-063
L105, L106	Inductor	ATH-049

CAPACITORS

Mark	Symbol & Description	Part No.
TC101	Trimmer	ACM-014
C115		CCDCH080D50
C113		CCDCH150J50
C114		CCDCH330J50
C101		CCDRH100D50
C105		CCDRH330J50
C102, C104, C106		CCDRH390J50
C108, C110		CCDSL010C50
C109		CCDSL020C50
C117		CCDSL050C50
C111		CCDSL101J50
C116		CCDTH180J50
C103, C112, C118, C119		CKDYF103Z50
C107		CKDYF223Z50
C130		CEA470M25L

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
All	resistors	RD1/8PM□□□J

1

2

3

4

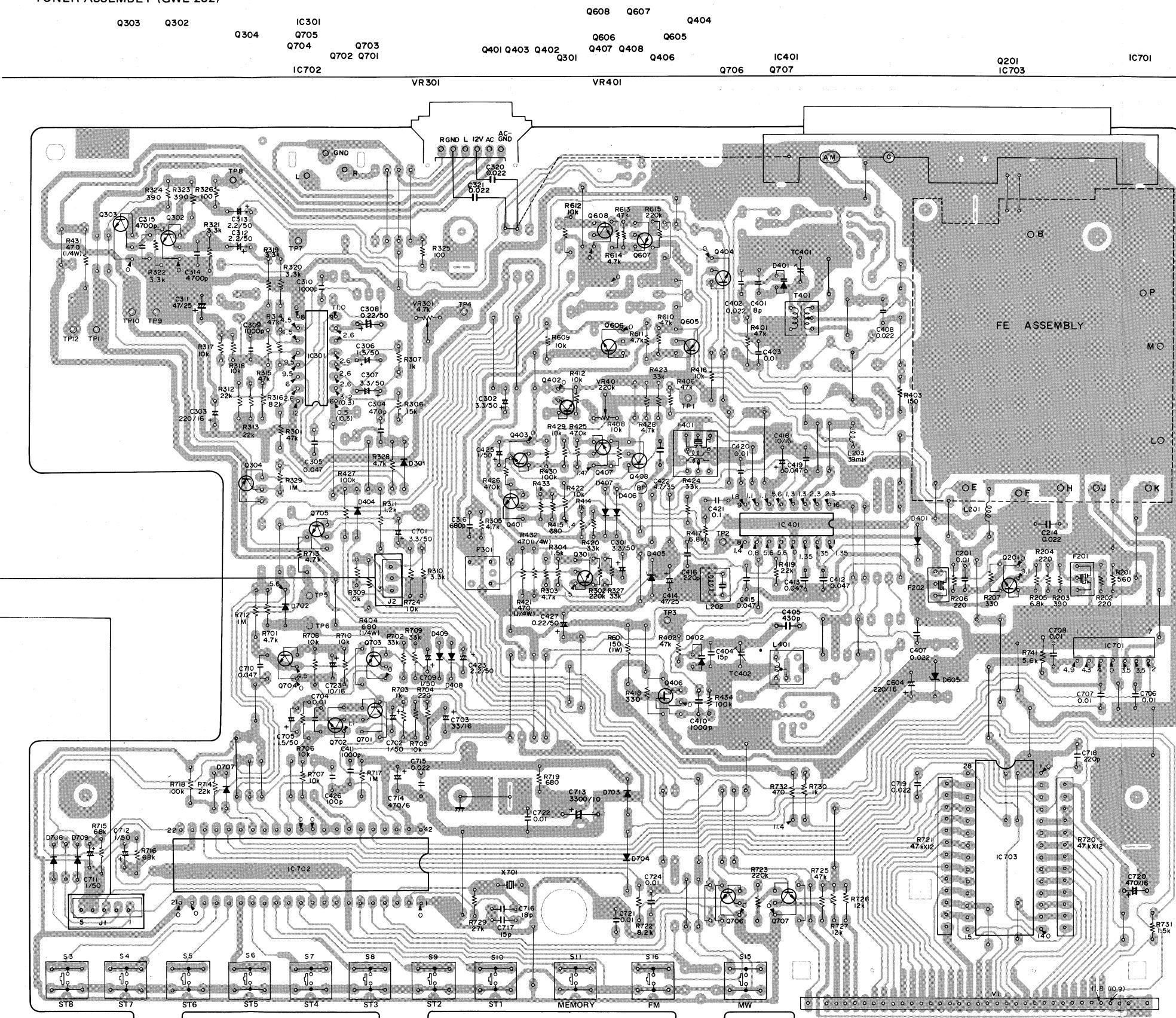
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4. P.C. BOARDS CONNECTION DIAGRAM

TUNER ASSEMBLY (GWE-232)



1

2

3

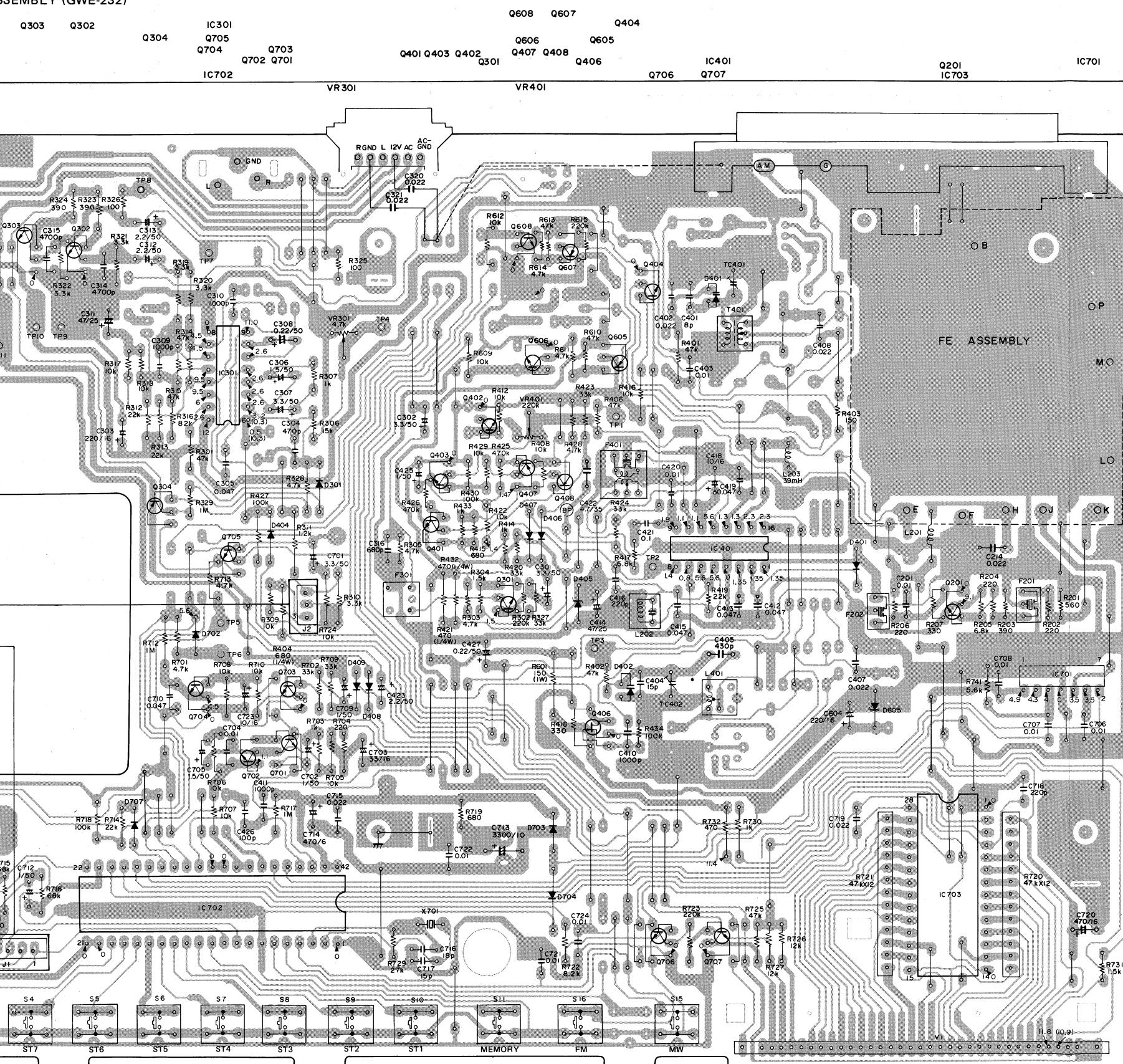
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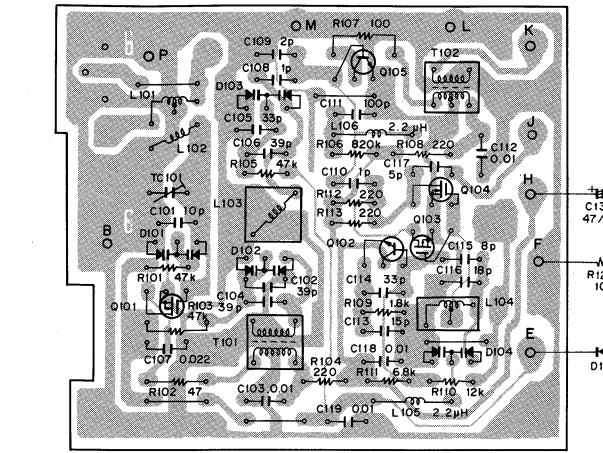
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ASSEMBLY (GWE-232)



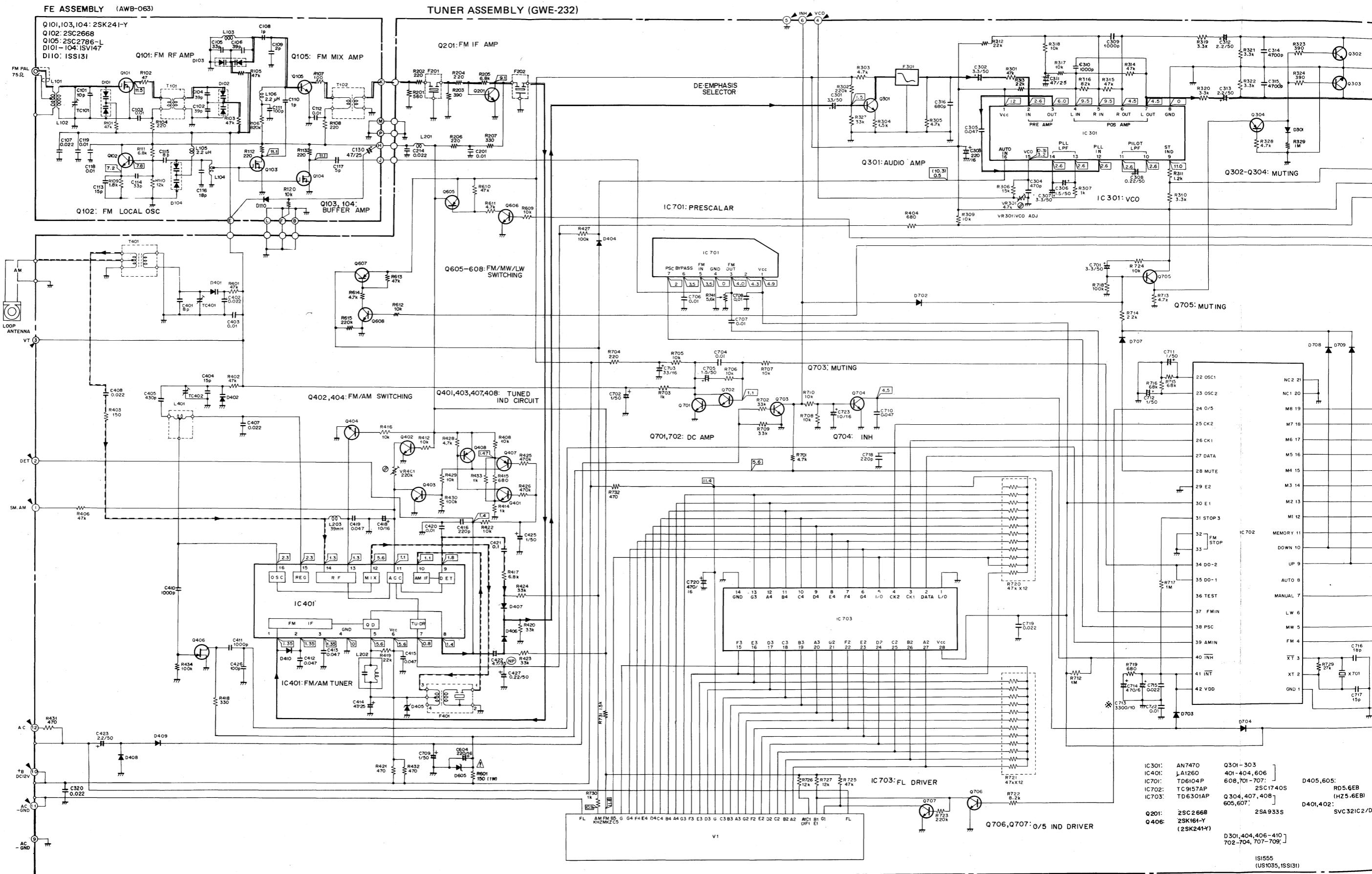
FE ASSEMBLY (AWB-06)

Q101	Q103	Q104
TC101	Q102	Q103

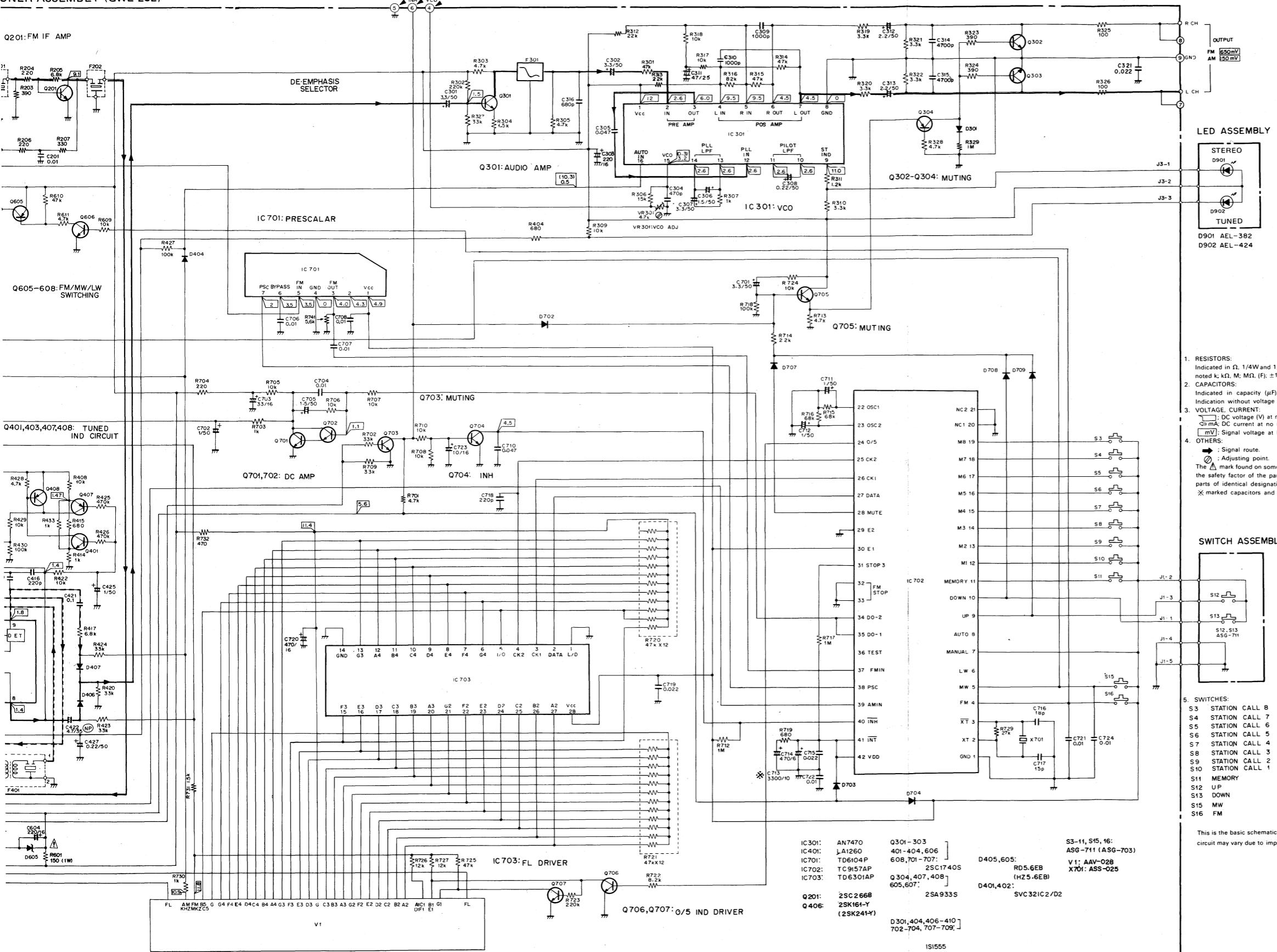


Q101, 103, 104	Q105 2SC2786
2SK241-Y	D101~104 1SV
Q102 2SC2668	D110 ISS131

5. SCHEMATIC DIAGRAM



UNER ASSEMBLY (GWE-232)



NOTE:

The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.

- 1. RESISTORS:**
Indicated in Ω , 1/4W and 1/8W, $\pm 5\%$ tolerance unless otherwise noted k, $k\Omega$, M, $M\Omega$, (F), $\pm 1\%$, (G), $\pm 2\%$, (K), $\pm 10\%$, (M), $\pm 20\%$ tolerance

2. CAPACITORS:
Indicated in capacity (μF)/voltage (V) unless otherwise noted p, pF.
Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE, CURRENT:

 - █ : DC voltage (V) at no input signal.
 - mA: DC current at no input signal.
 - ▀ mV: Signal voltage at FM 1kHz \pm 75 kHz DEV.

4. OTHERS:

 - : Signal route.
 - : Adjusting point.

The △ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

✗ marked capacitors and resistors have parts numbers.

SWITCH ASSEMBLY

5. SWITCHES:

S3	STATION CALL 8	NORMAL	OFF	
S4	STATION CALL 7	NORMAL	OFF	
S5	STATION CALL 6	NORMAL	OFF	
S6	STATION CALL 5	NORMAL	OFF	
S7	STATION CALL 4	NORMAL	OFF	
S8	STATION CALL 3	NORMAL	OFF	
S9	STATION CALL 2	NORMAL	OFF	
S10	STATION CALL 1	NORMAL	OFF	
S11	MEMORY	NORMAL	OFF	
S12	UP	NORMAL	OFF	
S13	DOWN	NORMAL	OFF	
S15	MW	NORMAL	OFF	
	F1	NORMAL	OFF	

This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

6. ADJUSTMENTS

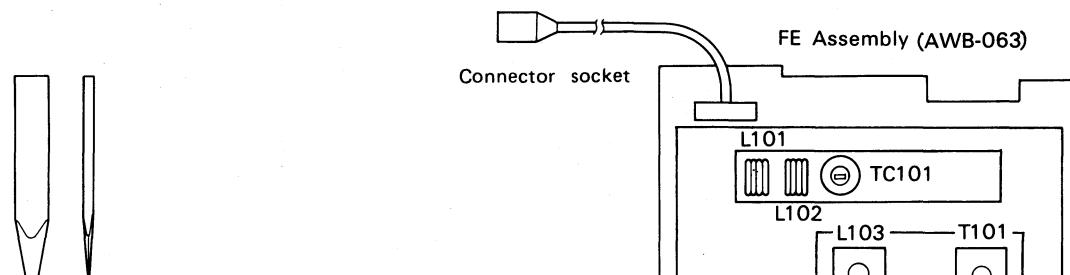
■ For servicing this type, please refer to the F-X20ZL adjustments in service manual (ARP-719: from page 17 to 22) with the exception of this adjustment.

● FM Tuner Section Adjustment

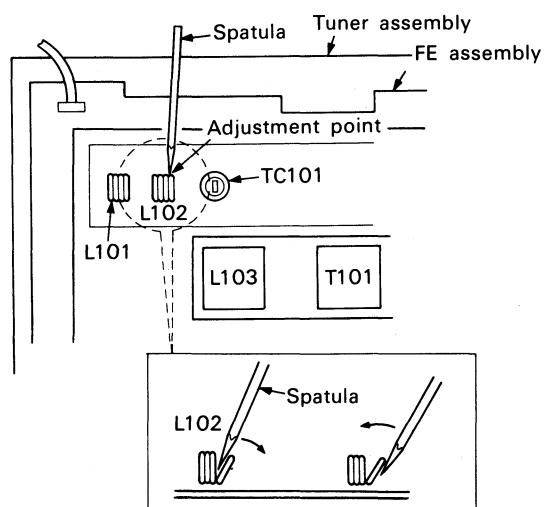
Step No.	FM SG (1 kHz±75 kHz dev.)		TX-221Z/ZEZ TX-220Z/ZEZ tuned frequency display	Adjustment	
	Frequency (MHz)	Level (dB)		Adjustment location	Specifications
3	(1) 90	20—30	90	L102*, L103, T101	Set the output from pin 1 of the tuner assembly to maximum level. (Before performing the adjustment of Step 3, turn VR401 fully counterclockwise.)
	(2) 106		106	TC101, L103, T101	
	(3) 90		90	L102*	
	(4) Repeat steps 3-② and 3-③ until both specification ratings are satisfied.				

* The expression "adjust L102" found in the text means that the tuning coil is to be extended outwards with spatula (non metal) as shown in Fig. 6-2.

● Spatula (Non metal: ex. Glass-Cloth Epoxy Resin)



Use a spatula whose an edge is thin.



To make the output maximum by opening and closing of the first right side turn of the coil.

Fig. 6-1 Adjustment positions

Fig. 6-2 Adjustment tuning coil L102